

An mHealth HIV prevention programme for youth: Lessons learned from the iloveLife.mobi programme in South Africa

This paper has been accepted and is published in *AIDS Care* [Volume 32 Issue sup2](#)

<https://www.tandfonline.com/eprint/VIDFBKU2ZTSXTTRW3PJD/full?target=10.1080/09540121.2020.1742866>

Maretha Visser

(Department of Psychology, University of Pretoria, South Africa)

Marinda Kotze

(Kaninzi Research Consulting, South Africa)

Madri Jansen van Rensburg

(Resilience Analysis Consulting, South Africa)

Abstract

A mobile-based behavioural change program iloveLife.mobi was implemented to prevent HIV among young people (12-24 years) in South Africa. The mobile site offered access to sexual and reproductive health and psychosocial information through interactive learning. The site provided incentives for positive behaviour (such as HIV testing). The research aimed to evaluate the effectiveness of the iloveLife.mobi site in promoting protective behaviour of users. A mixed-methods approach was used, including document review, KAPB survey (n=1882), group discussions (n=68) and telephonic interviews (n=175) with users and interviews with 46 project and community stakeholders. The SRH and psychosocial information on the site was age-appropriate and useful to young people (82.2%). The site reached young men who are generally difficult to reach with SRH information. High-frequency users reported more confidence related to condom use and HIV-testing and more protective behaviour (condom use, VMMC) compared to low-frequency users. Users also reported more protective behaviour (HIV testing, VMMC, condom use) than a comparable national sample. iloveLife.mobi became a repository for learning to reach young people with health information. The research highlights key issues to consider when implementing an mHealth platform in a low- or middle-income country, where literacy levels and technical infrastructure may cause challenges.

The development of mobile technology presents the opportunity to use innovative strategies to improve health outcomes (Collier, 2018). Mobile health (mHealth) is the use of mobile and wireless communication technology to improve health promotion, health care delivery, outcomes and research (Sing & Landman, 2017). The most common application of mHealth is the use of mobile devices to educate consumers about preventive health care especially in underserved areas characterized by a large population and widespread mobile phone use (WHO, 2011). Although most mHealth initiatives claim the potential of improving the coverage, quality and effectiveness of healthcare, there is limited evidence supporting this claim; their benefits and long-term results are not comprehensively evaluated (Gutierrez, Moreno, & Rebelo, 2017).

The *iloveLife.mobi* was a behavioural change intervention that used mobile technology to promote positive health behaviour among South African youth aged 12 to 24 years. *loveLife*, a not-for-profit, youth-focused, HIV-prevention organisation in South Africa developed *iloveLife.mobi*. The aim of the intervention was to contribute to change in key predictors of HIV risk behaviour (knowledge, beliefs, attitudes); to promote behaviour change (e.g. uptake of HIV testing (HCT) and voluntary medical male circumcision (VMMC)); and to contribute to the reduction in new HIV infections among young people. The *mobi* site provided access to information on a range of topics to promote healthy lifestyles among young people, such as sexual and reproductive health (SRH) and psychosocial information on self-esteem, relationships, peer pressure, substance abuse, career opportunities and access to youth-friendly health services. The site used interactive learning through short articles, audio drama, quizzes, self-assessments and discussion forums. To promote the use of the site and healthy behaviour, participants gained points for engagement on the site (registering, referring a friend, completing a quiz, engaging in discussion forums) and attending real-world activities (visiting a clinic) which allowed them to enter weekly lucky draws. Lucky draw prizes included entertainment, clothing and food vouchers, mobile airtime and data. Users also achieved status levels, based on their total points. The higher one's status level, the more attractive prizes one could win. A leader board was used to showcase the users who scored the most points and a hall of fame displayed the names of the most recent prize winners. The site was advertised through social media, other *loveLife* programmes and local radio stations. *iloveLife.mobi* was operational from July 2015 to February 2018 and attracted 101 344 users.

In June 2018 an external team was contracted to evaluate the *iloveLife.mobi* ex post facto in terms of SRH knowledge, attitudes, risk behaviour and the uptake of HCT and VMMC amongst users. The evaluation included project and impact components to identify the strengths, challenges and lessons learnt for future investments.

EVALUATION APPROACH AND DESIGN

A mixed-methods research approach was used, in which quantitative and qualitative data were collected and integrated (Cresswell & Plano Clark, 2007). The data collection strategy is outlined in Figure 1.

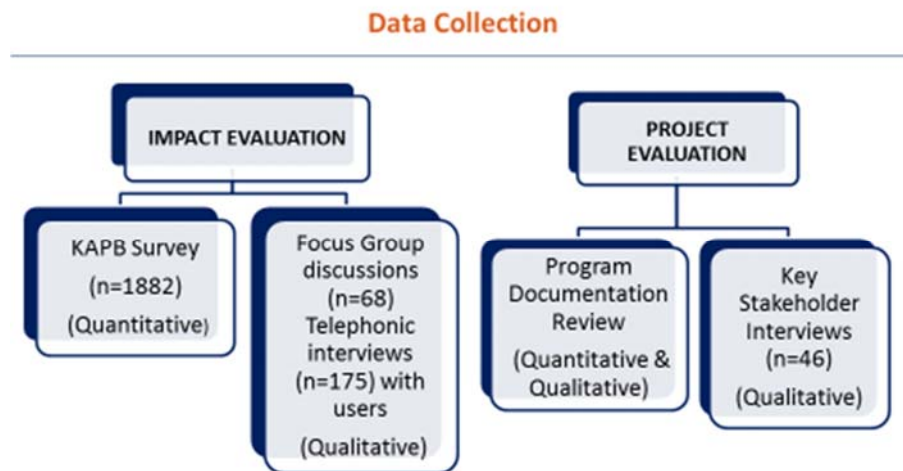


Figure 1 Data collection

Data collection instruments

Document review

A thorough review was conducted of project concept documents, quarterly progress reports and segments of the iloveLife.mobi database.

Key informant interviews

Face-to-face semi-structured interviews were conducted with 46 key stakeholders across the country (managers, regional implementers, community leaders, health care workers) about the use of the mobi site and young people's behaviour.

Survey

An online knowledge, attitudes, practices and behaviours (KAPB) survey was used, which included the following sections:

- 1) Basic demographic information
- 2) Use of the iloveLife.mobi site
- 3) Value of the site content (4-point rating scale)
- 4) Self-reported sexual risk and protective behaviour (indicators from national studies by Mbelle et al. (2014) and Simbayi et al. (2019)).
- 5) Self-reported impact of iloveLife.mobi on sexual risk and protective behaviour (5-point scale).

The survey was in English, given that the iloveLife.mobi site was strictly in English. The survey was hosted on an online survey software platform. The survey was designed to be feature-phone friendly, to accommodate mobi site users without access to smart phones.

The site's database was used to obtain the cellular contact numbers of registered users. A text message, with a link to the online survey, was sent to invite all users with unique numbers (n=22689) to complete the survey on their cell phones. A R50 (USD 3) airtime incentive was offered to 100 randomly selected survey respondents who completed the survey in full. A total of 1882 usable surveys were received (response rate of 8.28% of the user population). This was considered an acceptable sample size, as the ilovelife.mobi site had been offline for over eight months by the time the survey was conducted and many cellular numbers on the site were not updated and in all likelihood out of service. Text delivery reports showed that the message was successfully delivered to 4096 cellular numbers. On average, respondents spent 17 minutes to complete the survey.

Participatory group discussions

To understand the impact of the iloveLife.mobi site, nine group discussions were conducted with 68 users recruited from the loveLife youth centres in each province. Sixty percent participants were female, 12% were younger than 15 years, 38% were between 15 and 18 years and 50% between 18 and 24 years. Post graduate students trained as research assistants conducted group discussions of approximately 60 to 90 minutes in the participants' vernacular. The discussion topics included the usefulness of information and user-friendliness of the site; the impact of the site on their behaviour and barriers to use the site. Group discussions were audio-recorded, transcribed and analysed.

Telephonic interviews

Research assistants conducted telephonic interviews in the vernacular of participants, to reach users from around the country, including rural areas. Information from text message delivery reports, obtained during the survey, was used to identify a list of valid cell phone numbers (n=4069). The sample was drawn by selecting every 10th cell phone number on the list. This resulted in 467 numbers being phoned and 175 interviews being conducted. The interviews included the following topics: their use of the site, the perceived relevance of the site and its impact on their behaviour. Interviews took an average of 25 minutes and were audio-recorded for data quality and record-keeping purposes.

Data analysis

Basic descriptive analyses were done, while Pearson's chi-square tests were used to compare sub-groups. Qualitative data were summarised in a structured way. Thematic content analysis (Braun & Clark, 2006) was used to analyse data. Quotes from the interviews were used to illustrate findings.

Ethics

The evaluation protocol was approved by the Ethics Committee of the Faculty of Humanities, University of Pretoria. When site users registered, they provided iloveLife written permission to confidentially share their personal information with a third-party research partner. This gave the evaluation team the right to contact them for research purposes. All persons involved in the evaluation participated voluntarily and provided informed consent. Caregivers of children under 18 years provided consent for interviews and group discussions. Because young people used the site in privacy on their phones, we did not actively seek informed consent from caregivers for children completing the survey. Though, we stipulated in the conditions for completing the survey that persons younger than 18 years should first ask permission from their caregivers before completing the survey. No personally identifiable information was collected, and results were anonymously shared.

RESULTS

Reach of the site

According to the iloveLife.mobi database, there were 101344 registrations, of which 22689 were unique registrations. Most of the registrations (77.3%) took place when the site was launched in July 2015 and in April 2016 and May 2017 when radio and social media marketing campaigns took place. During these campaigns, R5 (USD 0.3) airtime was given to every newly registered user. Most of the users (87%) did not engage with the site extensively and did not earn many points. There were 2864 active users part of the different status levels, 54.6% of whom were female. The average age of registered users was 22.9 years, while 32.4% of active users were older than the intended target audience (12-24-year olds). This may suggest that the content of the site was of interest to slightly older youth. Younger youth (aged 12-18) may have been less interested in the content; or they may not have access to mobile phones or data to access the site often.

Demographics of survey respondents

The respondents were 61.4% female and 96% were black. Their ages ranged from 13 to 45 years, with an average age of 24.2 years. Respondents were from all nine provinces with 53.5% from rural areas. A small number (4.1%) were currently in school, while 35.3% were studying at tertiary institutions. Of the respondents not studying full-time, 26.8% were employed and 33.8% were unemployed.

Use of a digital platform

Most of the young people interviewed felt that the site was easily accessible, user-friendly and easy to navigate. Lack of data and internet access were the most important reason for not using the site more often (54%) or to stop using the site (58%). Forgetting about the site was also noted as a reason for not using the site often (33%).

Site content

Most survey respondents indicated that they found the site very useful (82.2%). They described the site as informative, educational, age-appropriate, user-friendly and interactive. Figure 2 illustrates the respondents' evaluation of the usefulness of various topics.

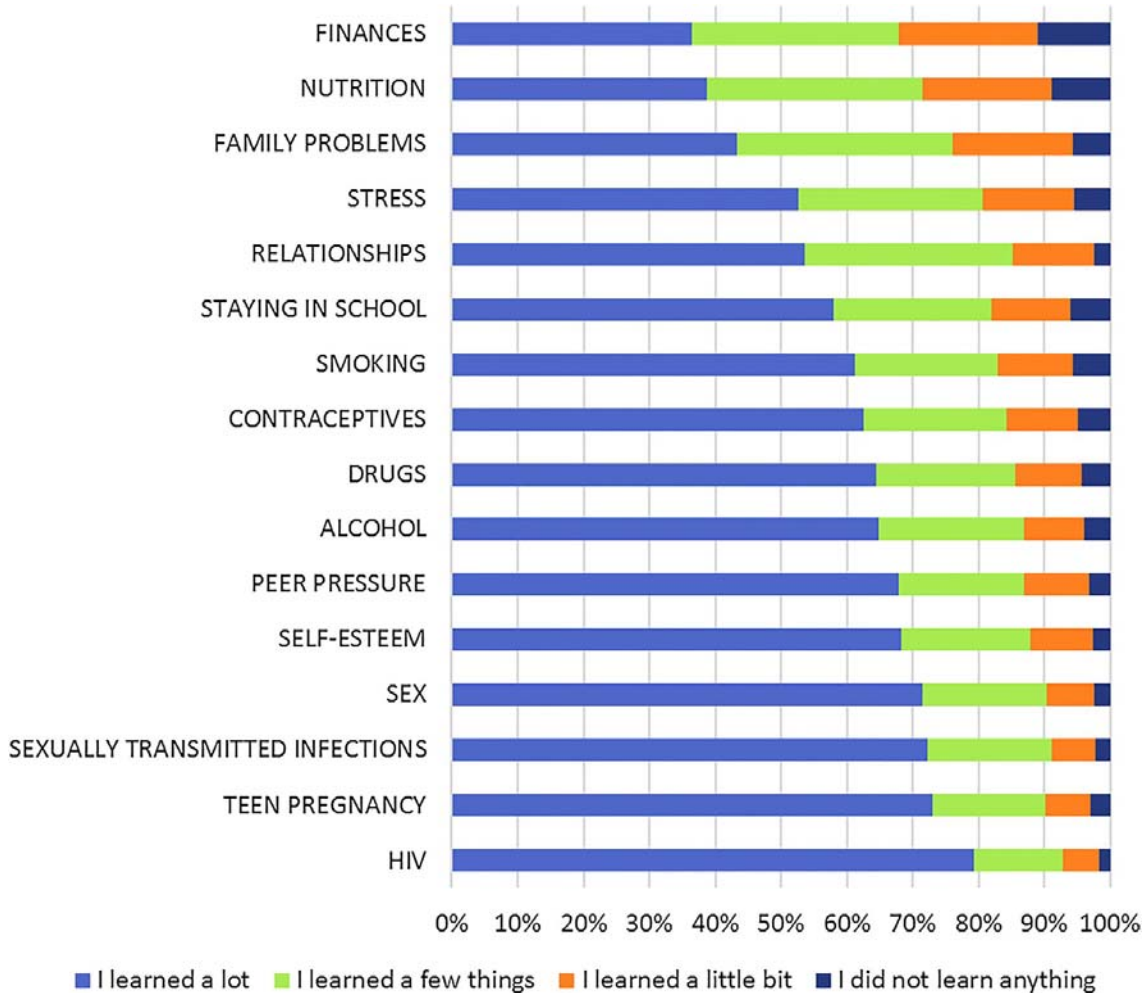


Figure 2. Perceived usefulness of information on various topics.

Most respondents reported that they learned a lot about HIV (79.3%), teenage pregnancy (73.0%), sexually transmitted infections (72.3%) and sex (71.5%). This is illustrated in the following quotes of young people interviewed:

The most important lesson for me as a teenager was on sex. I am still in an experimental stage, so it helped me to experiment safely and not to expose myself to harmful or dangerous situations.

Our parents find it difficult to talk to us about sex. As a result, we are not told how to prevent pregnancy. Now we know about the dangers of sexually transmitted diseases and different types of contraceptives to prevent becoming pregnant.

Indeed, it help a lot. At times it provided new information like different contraceptives and STIs but at times it validated information that we already knew from school or other sources.

Respondents also learned about self-esteem (67%), how to deal with peer pressure (67%), alcohol and drug abuse (65%) and relationships (53%). This is illustrated in the quotes below:

The most important lesson I learned was that my problems were not unique. Many people were going through the same challenges. I learned that there is no situation beyond control.

I got pregnant as a teenager. I was sad and angry most of the time. The site gave me information which helped me to understand my situation, what it means to be a mother and how to deal with the father.

It taught me how to cope with stress and communicate effectively and not resort to alcohol or substances when I have problems. After using the site I started taking charge of my life.

The site offered young people a link (help button) to a loveLife call centre where they could talk to a counsellor about personal issues. The direct link to a counsellor was valued:

It was very helpful, as I was going through a lot and it helped me to connect to loveLife helpline. I could share my problems knowing I will not be judged for anything.

The main benefit of the site for the users was that it provided them with a private space free of judgement, where they could learn more about themselves, their health and relationships which empowered them to make healthy choices:

The site was very educative and helpful. Being a man it is not easy to share your problems with someone because of your pride and ego. The site gave me that platform where I could share my problems without losing my manhood.

One can access the site on your own in privacy and therefore do not feel embarrassed or shy unlike asking questions to people or asking embarrassing questions in the presence of other people.

The site stimulated anonymous interaction among young people where they could discuss topics, share opinions and learn from others. The leader board and hall of fame introduced friendly competition amongst the users and added a social aspect to the site. Besides the short articles, the

site included a series of short audio dramas which was most popular – it allowed those with limited reading abilities to access SRH information.

Frequency of use

Almost half of the respondents (49%) reported they were high-frequency users (every day or a few times a week) (Table 1). More males than females ($p < .001$) were high-frequency users. High-frequency users were more likely to report that they used the site for an extended time (19 months or longer) compared to low-frequency users, who reported using the site for six months or less. High-frequency users were more likely to receive rewards (28.4%) than low-frequency users (17.0%) ($p < .001$); although, very few respondents received rewards – 77% respondents never won a prize.

	Female	Male	Total
High (everyday; few times a week)	509 (45,6%)	381 (54,4%)	890 (49,0%)
Moderate (once a week to once a month)	298 (26,7%)	182 (26,0%)	480 (26,4%)
Low (once every few months or less)	309 (27,7%)	138 (19,7%)	447 (24,6%)
Total	1116 (100%)	701 (100%)	1817 (100%)

Additional to individual use, loveLife community-based mentors used the site in their group discussions with at-risk youth. Respondents in support groups reported that one member would register on the site and share the information with the rest of the group. Teachers used the site for information to use in their classes:

The iLoveLife.mobi site was very helpful for me as a teacher, because it became a source for research for learner support. Most of the information in that site is useful for learners. (Teacher)

Outcome data

Frequency of site use was used in the research as an indicator of users' site exposure. High-frequency users were more exposed to the site's content than those who reported minimal site engagement. Comparing high- and low-frequency users could, therefore, provide some insight into the extent to which exposure to the site impacted users' SRH knowledge, attitudes and behaviour (Table 2).

High-frequency users benefitted significantly more from the site than low-frequency users. They were more confident that they will be able to abstain from sex, insist on condom use and taking an HIV test ($p < .001$). High-frequency users reported lower risk behaviour, including more frequent and consistent condom use, less intergenerational relationships and later sexual debut (older than 15 years) ($p < .001$). Male high-frequency users were more likely to report being circumcised than low-frequency users. No significant differences were found for having multiple sexual partners the past 12 months.

Table 2 Differences between high and low-frequency users				
Variable	High-frequency users (n=890) (%)	Low-frequency users (n=447) (%)	Chi squared	P value
Confidence to abstain from sex	67.0	53.8	183.89	<0.001
Confidence to insist on condom use	90.1	85.2	174.53	<0.001
Confidence to test for HIV	95.6	93.2	301.20	<0.001
HIV risk/protective behaviour				
Used a condom at last sex	80.9	69.4	284.84	<0.001
Consistent condom use	77.3	68.9	154.00	<0.001
Not in intergenerational relationship	77.5	74.8	132.37	<0.001
Early sexual debut (<15 years)	11.0	15.1	298.13	<0.001
VMMC	87.6	72.9	74.93	<0.001
Respondents who reported that the site motivated them to:				
Be more aware of risk of unprotected sex	96.4	92.4	234.84	<0.001
Protect themselves against HIV	90.7	86.0	227.10	<0.001
Use condoms	91.8	84.1	207.64	<0.001
Undergo VMMC	62.0	57.4	66.62	<0.001
Use contraception	84.6	80.7	188.49	<0.001
Test for HIV	92.2	86.0	231.41	<0.001
Be positive about the future	92.6	85.7	237.42	<0.001

Although survey respondents generally considered the site helpful, high-frequency users were more likely to report that the site motivated them to protect themselves against HIV, use condoms consistently, know their HIV status, use contraceptives, undergo VMMC and to be more positive about their future ($p<0.001$). A quote that illustrates motivation to test for HIV:

The iloveLife.mobi site gave me knowledge to confront my fear of knowing my HIV status. I have been to the clinic and tested for HIV.

Impact

Participants reported that the site had a meaningful impact on their lives, attitudes and behaviour. It motivated them to protect themselves and to test for HIV. Although one cannot assume any causal relationships, the survey respondents reported high levels of protective behaviour such as condom use, VMMC and HIV-testing – higher than the results of a comparable national sample (Simbayi et al., 2019) (Table 3). They also had less intergenerational sexual relationships. However, in contrast,

iloveLife.mobi users reported higher levels of multiple sexual partners, compared to the national sample.

	iloveLife respondents#			National survey (Simbayi et al., 2019)		
	male	female	total	male	female	total
Sexual debut before the age of 15 years	18.6%	7.3%	11.8%	19.5%	7.6%	13.6%
Condom use at last sex	81.7%	74.2%	77.2%	67.7%	49.8%	
VMMC	83.3%			61.6%		
HIV-testing	83.0%	89.5%	87.0%	70.9%	79.3%	75.2%
Intergenerational sex (15-19 years)			13.8%			17.9%
Multiple sexual partners (2 or more partners in the past 12 months)	55.7%	34.2%	42.8%	25.5%	9%	

reported data for the age group 15-24 years to be comparable with national sample

DISCUSSION

The iloveLife.mobi site gave young people private access to age-appropriate information about SRH and psychosocial skills they may not have access to otherwise. The site became a learning repository that was used by various role players. The impact of the site is visible in the positive behaviour trends reported by the users. On average, high-frequency users reported safer sexual practices and greater confidence to make positive SRH choices than low-frequency users. Additionally, iloveLife users between the ages of 15 and 24 reported more protective behaviour, such as consistent condom use, undertaking HIV testing and VMMC, than a comparable national sample (Simbayi et al., 2019). Although more females registered on the site, more males were high-frequency users – possibly because of the site’s privacy and opportunities for competition. The site, therefore, reached young men, who are generally difficult to reach with SRH information (Matseke et al., 2017; Stern, Rau, & Cooper, 2014). The site appealed to a slightly older age group than was expected (average age was 22.9 years). The mHealth modality may be more accessible to older youths.

The findings highlight several key issues to consider when implementing an mHealth platform in low- or middle-income countries, where literacy levels and technical infrastructure may cause challenges in implementation. Access to smartphones, internet services and data were barriers to using the site. Reduced data cost or a reversed costing system may be negotiated to enhance the use of the site. A continuous marketing strategy and regular notifications of new content could assist in reaching and sustaining the interest of large numbers of young people. A rigorous monitoring and

evaluation system should be built into the site database to ensure that its effectiveness and impact can be measured accurately.

The survey findings must be interpreted with caution, given that the evaluation was conducted without a baseline or control group and relied mainly on respondents' self-report. Without a control group, objectively verifiable data, and a baseline, it is difficult to determine conclusively whether behaviour changed and whether these changes were due to exposure to the site. Exposure to alternative SRH programmes makes it impossible to identify the unique contribution of the site. Selection bias may also be present as, site users (especially high-frequency users and survey respondents in particular), may have been intrinsically motivated to learn about SRH, more so than the general youth population. The evaluator's ability to establish a possible causal link between the iloveLife.mobi site and the evaluation's findings are therefore limited.

The research emphasised the value of mobile technology and edutainment (combining information and fun) to reach young people with sensitive health information. The respondents valued the information on the site and reported some positive protective behaviour. The iloveLife.mobi has the potential to contribute to HIV prevention. The cost-effectiveness of implementation and maintenance of such an mHealth project need to be investigated (Gutierrez et al., 2017) to determine its future development.

Acknowledgements

The ilovelife.mobi site was developed by loveLife in a programme by the South African National Department of Health financed by the Federal Republic of Germany through KfW Development Bank and iloveLife. The research was commissioned and financed by KfW Development Bank.

References

- Braun, V. & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative research in psychology*, 3(2), 77-101. DOI: [10.1191/1478088706qp063oa](https://doi.org/10.1191/1478088706qp063oa)
- Collier, J. (2018). mHealth: What is it, and how can it help us? *Medical News Today*. <https://www.medicalnewstoday.com/articles/322865.php>
- Cresswell, J. W. & Plano Clark, V. L. (2007) *Designing and Conducting Mixed Methods Research*. Thousand Oaks, CA: Sage.
- Gutierrez, M.A., Moreno, R.A., & Rebelo, M.S. (2017). Information and communication technologies and global health challenges. In Marin, H.dF., Massad, E., Gutierrez, M.A., Rodrigues, R.J., &

- Sigulem, D. (Eds.) (2017). *Global Health Informatics: How information technology can change our lives in a globalized world* (pp.50-93). Elsevier.
- Matseke, M.G., Ruiter, R.A.C., Rodriguez, V.J., Peltzer, K., Setswe, G., & Sifunda, S. (2017). Factors associated with male partner involvement in programs for the prevention of mother-to-child transmission of HIV in rural South Africa. *International Journal of Environmental Research and Public Health*, 14, 1333. DOI: [10.3390/ijerph14111333](https://doi.org/10.3390/ijerph14111333)
- Mbelle, N., Setswe, G., Sifunda, S., Mabaso, M., & Maduna, V. (2014). *HIV and AIDS related knowledge, attitudes and behaviours of students and staff at South Africa's technical and vocational education and training colleges, 2014*. Pretoria, South Africa: HEAIDS.
- Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton, NJ: Princeton University Press.
- Simbayi, L.C., Zuma, K., Zungu, N., Moyo, S., Marinda, E., ... Naidoo, I., and SABSSM V team (2019). *South African National HIV Prevalence, Incidence, Behaviour and Communication Survey, 2017*. Cape Town, South Africa: HSRC Press.
- Sing, K. & Landman, A.B. (2017). Mobile health. In Sheikh, A., Bates, D., Wright, A., Cresswell, K. (Eds.). *Key advances in clinical informatics, transforming health care through health information technology*. Academic Press.
- Stern, E., Rau, A., & Cooper, D. (2014). Sexual and reproductive health perceptions and practices as revealed in the sexual history narratives of South African men living in a time of HIV/AIDS. *SAHARA-J: Journal of Social Aspects of HIV/AIDS*, 11(1), 233-244. DOI: [10.1080/17290376.2014.985701](https://doi.org/10.1080/17290376.2014.985701)
- World Health Organization (2011). *mHealth: new horizons for health through mobile technologies*. Geneva: WHO.